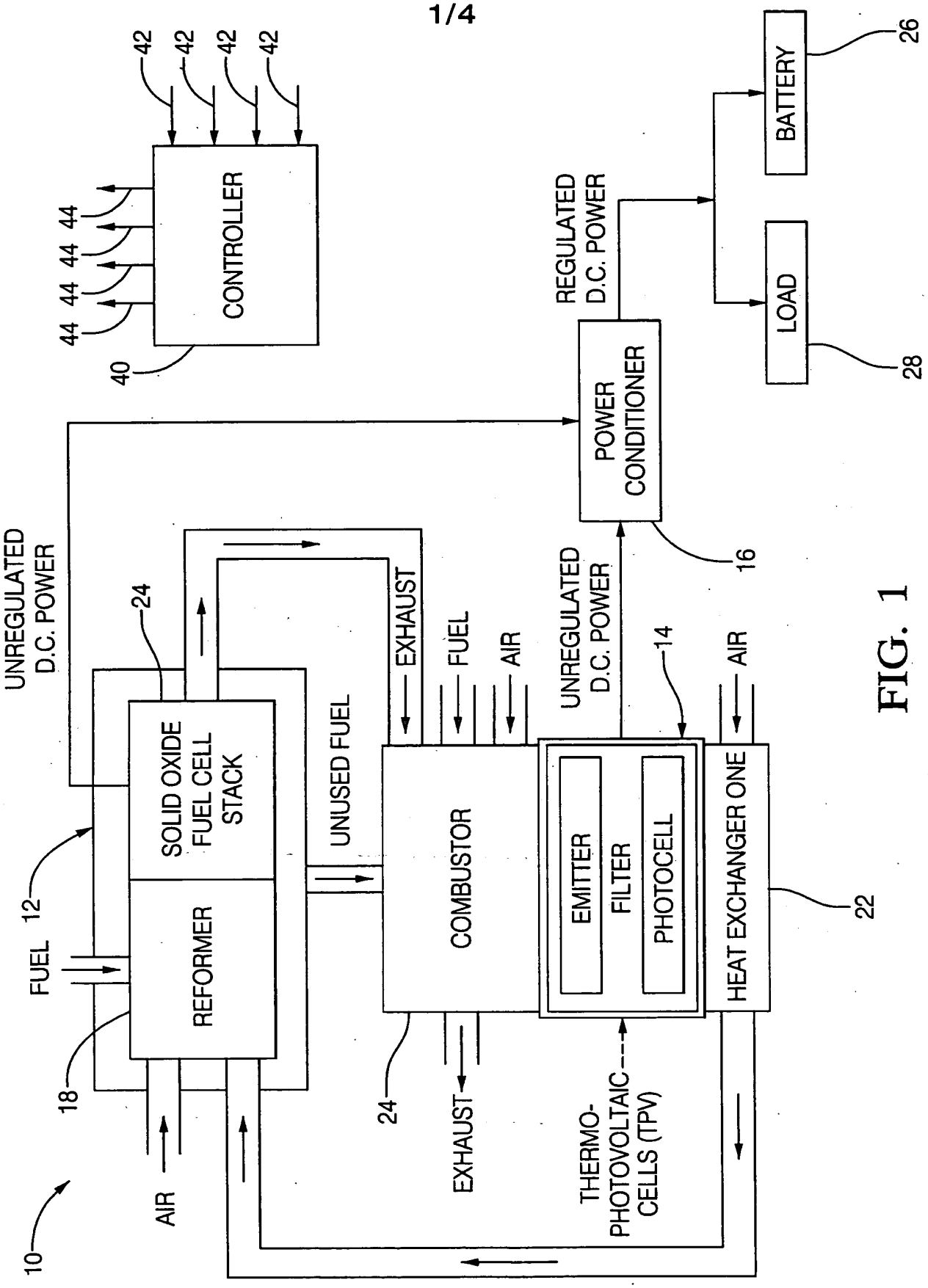
42
42
42
42
CONTROLLER
44
44
44
44
44
40
BATTERY
26
REGULATED
D.C. POWER
LOAD
28
POWER
CONDITIONER
16
UNREGULATED
D.C. POWER
24
EXHAUST
FUEL
AIR
UNREGULATED
D.C. POWER
14
AIR
SOLID OXIDE
FUEL CELL
STACK
UNUSED FUEL
COMBUSTOR
EMITTER
FILTER
PHOTOCELL
HEAT EXCHANGER ONE
22
12
FUEL
REFORMER
18
24
EXHAUST
THERMO-
PHOTOVOLTAIC
CELLS (TPV)
AIR
10

FIG. 1

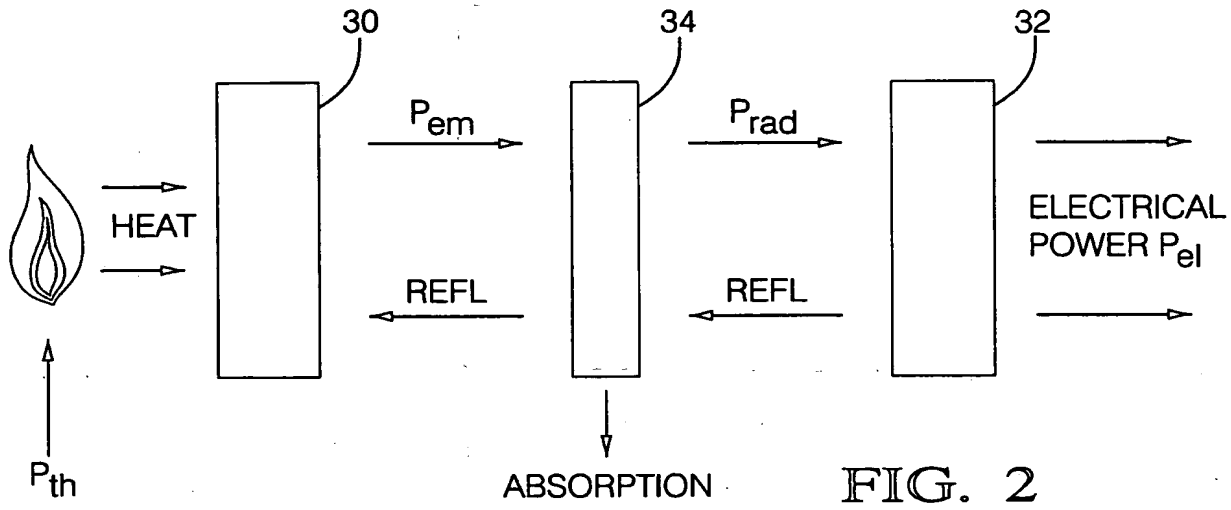
30
34
32
P_{em}
P_{rad}
HEAT
REFL
REFL
ELECTRICAL
POWER P_{el}
P_{th}
ABSORPTION

FIG. 2

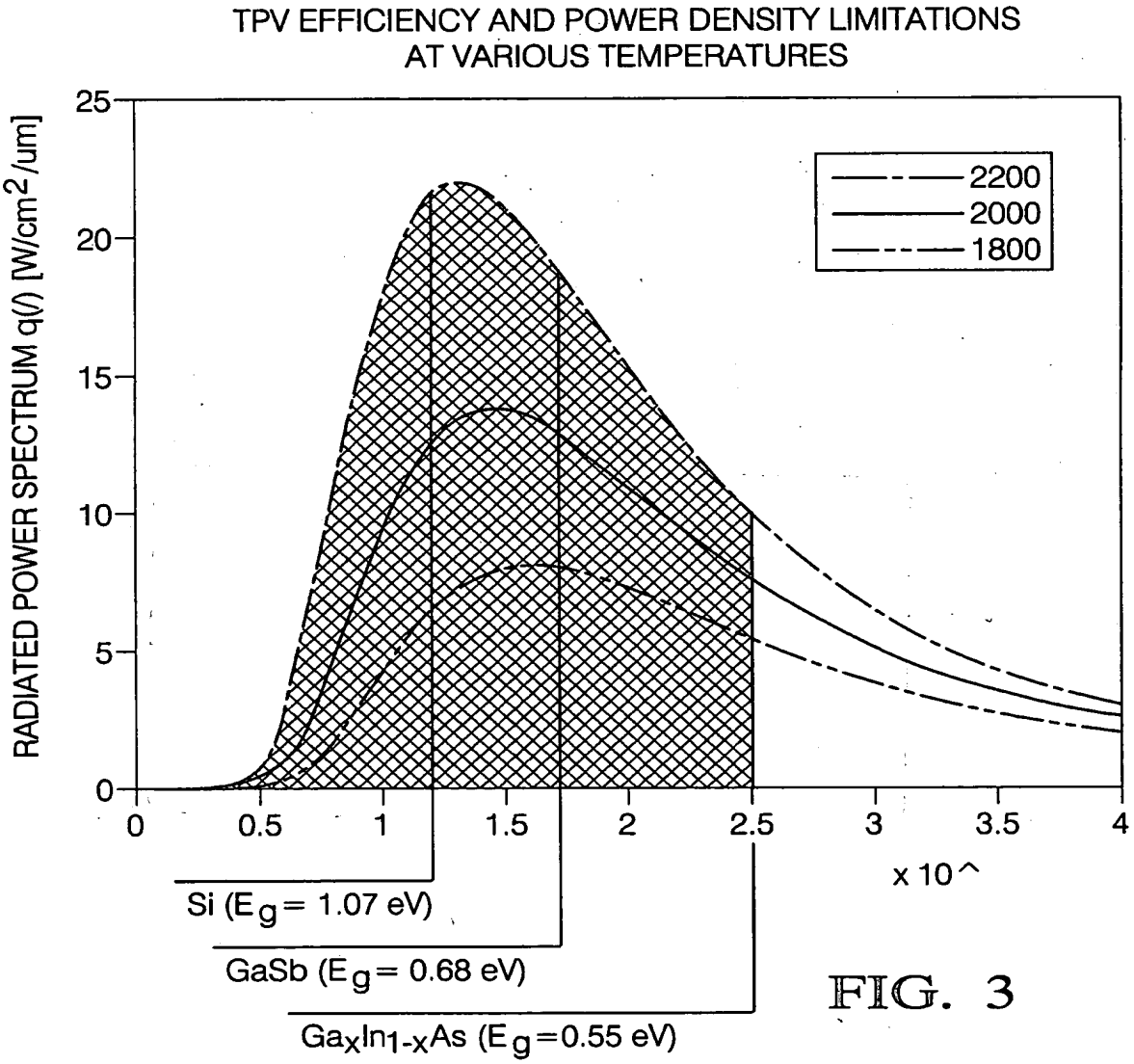
TPV EFFICIENCY AND POWER DENSITY LIMITATIONS
AT VARIOUS TEMPERATURES
RADIATED POWER SPECTRUM q(/) [W/cm2/um]
25
20
15
10
5
0
0
0.5
1
1.5
2
2.5
3
3.5
4
x 10^
2200
2000
1800
Si (E_g = 1.07 eV)
GaSb (E_g = 0.68 eV)
$Ga_xIn_{1-x}As$ (E_g = 0.55 eV)

FIG. 3

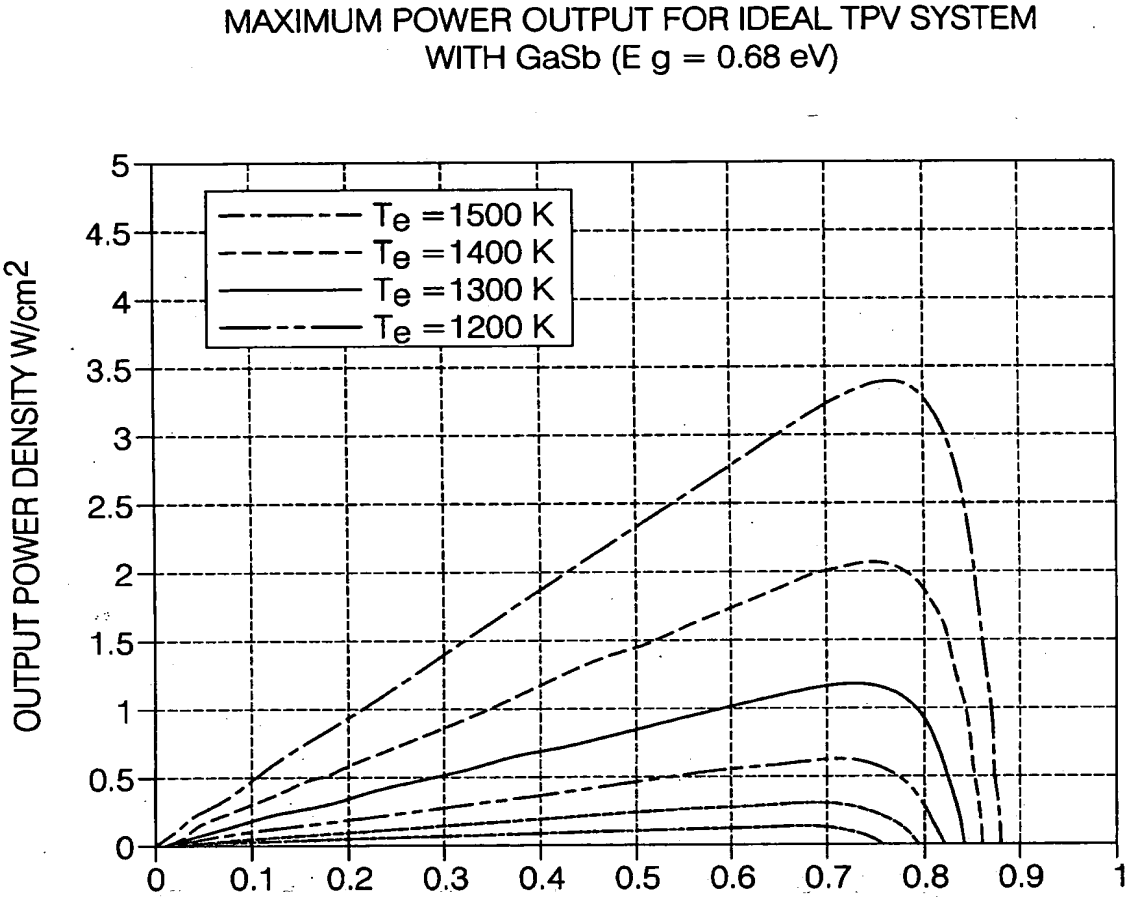
MAXIMUM POWER OUTPUT FOR IDEAL TPV SYSTEM
WITH GaSb (E g = 0.68 eV)
OUTPUT POWER DENSITY W/cm2
Te =1500 K
Te =1400 K
Te =1300 K
Te =1200 K
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1

FIG. 4

				ASSUMES 65% UTILIZATION OF WASTE HEAT	THERMO-PHOTO-ELECTRIC CONVERSION EFFICIENCY (15%) POWER DENSITY 4.0 WATTS/cm ^ 2		
INPUT FUEL POWER	ELECTRIC POWER/ FUEL POWER SOFC EFFICIENCY (%)	SOFC ELECTRIC POWER (kW)	WASTE OR EXHAUST POWER (kW)	INPUT THERMAL POWER AVAILABLE TO THERMO-PHOTO-ELECTRIC (kW)	INPUT THERMO-PHOTO-ELECTRIC POWER (kW)	COMBINED EFFICIENCY	THERMO-PHOTO-ELECTRIC ACTIVE AREA cm ^ 2
15.00 kW	10	1.5	13.50	8.78	1.32	18.78	329
	15	2.25	12.75	8.29	1.24	23.29	311
	20	3.00	12.00	7.80	1.17	27.80	293
	25	3.75	11.25	7.31	1.10	32.31	274
	30	4.50	10.50	6.83	1.02	36.83	256
	35	5.25	9.75	6.34	0.95	41.34	238

FIG. 5